

ACCESSION #: 9601260327

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Sequoyah Nuclear Plant (SQN), Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000327

TITLE: Manual Reactor Trip as Result of Main Generator Exciter

Problems

EVENT DATE: 12/25/95 LER #: 95-019-00 REPORT DATE: 01/19/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: S. D. Gilley, Compliance Licensing TELEPHONE: (423) 843-7427

Engineer

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: TL COMPONENT: EXC MANUFACTURER: W120

REPORTABLE NPRDS: NO

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On December 25, 1995, at 0713 Eastern standard time (EST), with Unit 1 at 100 percent power, a manual reactor trip was directed by the shift operations supervisor (SOS). The unit had received a Generator 1 Exciter Field Overcurrent alarm and was experiencing oscillating meter indications associated with the main generator excitation system, including meter indications that the electrical megawatt output on the main generator was fluctuating 100-150 megawatts. The manual reactor trip was directed when the SOS determined that control of the generator excitation system had been lost and could not be

regained. The reactor protection systems responded to the trip as expected. Operators responded to the trip as prescribed by procedures and stabilized the reactor in the hot standby condition. The root cause of this event was a field pole failure in the main generator exciter. The corrective action was to replace the exciter. This action is complete.

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## I. PLANT CONDITIONS

Unit 1 was in Mode 1 at 100 percent power.

## II. DESCRIPTION OF EVENT

### A. Event

On December 25, 1995, at 0713 Eastern standard time (EST), with Unit 1 at 100 percent power, a manual reactor trip was directed by the shift operations supervisor (SOS). The unit had received a Generator 1 Exciter Field Overcurrent alarm (EIIIS Code IB) and was experiencing oscillating meter indications associated with the main generator excitation system (EIIIS Code TL), including meter indications that the electrical megawatt output on the main generator (EIIIS Code TB) was fluctuating 100-150 megawatts. The manual reactor trip was directed when the SOS determined that control of the generator excitation system (EIIIS Code TL) had been lost and could not be regained.

### B. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

### C. Dates and Approximate Times of Major Occurrences

December 25, 1995 Unit 1 received a Generator 1 Exciter Field at 0710 EST Overcurrent alarm, and the following instrumentation was observed to be swinging full scale: exciter volts, exciter amps, MVARs, main generator amps (Phases A, B, and C), voltage regulator/base adjust, generator field volts, generator field amps, and generator volts. The voltage indications for the 6.9-kilovolt (kV) unit boards and shutdown boards were oscillating as was the main generator megawatt output and the generator neutral transformer voltmeter.

December 25, 1995 The SOS directed that a manual reactor trip at 0713 EST be initiated on Unit 1 due to the generator megawatt output swinging 100-150 megawatts electric and the determination that control of the main generator excitation system had been lost and could not be regained.

#### D. Other Systems or Secondary Functions Affected

None.

#### E. Method of Discovery

The operators in the main control room observed various

annunciators in conjunction with electrical indications which were swinging outside their normal values.

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#### F. Operator Actions

The operators initiated a manual reactor trip. The necessary actions were taken to shutdown the unit and maintain it in a safe condition.

#### G. Safety System Responses

The plant responded to the manual reactor trip as designed.

### III. CAUSE OF EVENT

#### A. Immediate Cause

The immediate cause of this event was the manual reactor trip directed by the SOS in response to the loss of control of the main generator excitation system.

#### B. Root Cause

The root cause of the event was determined to be the result of an extensive failure along the length of one side of the coil on the No. 7 exciter field pole and another ground which involved a short between a signal lead and the grounded shield on the cable to the main control room exciter field voltmeter.

The ground currents circulating in the cable shield were adjacent to the meters that were swinging in the main control room. Based on the evaluation of other plant parameters, the

erratic indications were induced by ground currents and did not represent actual changes in the plant. The SOS directed the manual reactor trip when he determined that control of the generator excitation system had been lost and that extensive damage to the main generator, exciter, or voltage regulation circuit could occur.

#### C. Contributing Factors

None.

### IV. ANALYSIS OF EVENT

The excitation system establishes the electrical field necessary for the rotation of the main generator to produce electrical output. A ground loop in the excitation system caused erratic displays on electrical indications associated with this system. Based on these erratic displays a manual reactor trip was initiated. The plant response to the trip was consistent with that described in the FSAR. Therefore, it can be concluded that there were no adverse consequences to plant personnel or to the general public as a result of this event.

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### V. CORRECTIVE ACTIONS

#### A. Immediate Corrective Action

When control of the main generator excitation system was lost, the SOS directed the operators to manually trip the reactor.

## B. Corrective Action to Prevent Recurrence

The exciter was replaced.

## VI. ADDITIONAL INFORMATION

### A. Failed Components

A field pole on the main generator exciter manufactured by Westinghouse, Serial Number 77PO766-1, Frame BB No. A201C.

### B. Previous Similar Events

A review of previous similar events identified two previous events on Unit 2 that involved a reactor trip as the result of overexcitation problems. LER 50-328/93001 involved a reactor trip as the result of a steam leak which flowed onto the nearby main generator voltage regulator cubicle. This caused an overvoltage condition to exist on the main generator. The second similar event identified, resulted in a turbine and subsequent reactor trip of Unit 2. LER 50-328/93006 involved missing insulation in the exciter which was determined to be the most probable cause of multiple grounds in the exciter. These grounds resulted in a rise in stator cooling temperature that actuated a temperature switch which initiated the turbine trip. This exciter on Unit 2 was replaced with the exciter from Unit 1 and the Unit 2 exciter was shipped offsite for refurbishment. Both of the events described above involved the exciter that was installed on Unit 1 and was involved in the

event described by this LER. This exciter was sent offsite for complete refurbishment following the event described by LER50-328/93006. Following refurbishment the exciter was installed in Unit 1 and was placed in service on April 20, 1994 and operated without incident until November 27, 1995 when the generator was removed from service due to a ground on the No. 9 field pole winding and a grounded jumper cable to the current winding resistors. The field pole winding and jumper cable were replaced and the unit returned to service November 30, 1995 and did not experience any other exciter problems until the event described by this LER.

## VII. COMMITMENTS

None.

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Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy,  
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R.J. Adney

Site Vice President

Sequoyah Nuclear Plant

January 19, 1996

U.S. Nuclear Regulatory Commission

ATTN: Document Control Desk

Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN)  
UNIT 1 - DOCKET

NO. 50-327 - FACILITY OPERATING LICENSE DPR-77- LICENSEE EVENT  
REPORT

(LER) 50-327/95019

The enclosed LER provides details concerning a manual reactor trip that was initiated as a result of oscillating meter indications associated with the main generator excitation system. This event is being reported in accordance with 10 CFR50.73(a)(2)(iv) as an event that resulted in the actuation of engineered safety features, including the reactor protection system.

Sincerely,

R. J. Adney

Enclosure

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Enclosure

cc (Enclosure):

INPO Records Center



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